USE OF COMPUTERS AT MOREHEAD STATE UNIVERSITY BY FRESHMEN AND SENIORS DURING THE SPRING SEMESTER OF 1999

ABSTRACT OF APPLIED PROJECT

An applied project submitted in partial fulfillment

of the requirement for the degree of

Education Specialist at Morehead State University

By

Debbie A. White

Committee Chairman: Dr. Joseph Armstrong

Assistant Professor of Adult Education, Leadership and Secondary Education

1999

ABSTRACT

This study investigated computer usage patters of freshmen and seniors at MSU during the Spring semester of 1999. This research considered one primary research question: "Are there any differences in computer usage patterns between freshmen and seniors?" In order to test the primary research question, six subordinate questions were developed. They were: (1) What software applications are being used by students at MSU? (2) What percentage of courses are requiring the use of a computer? (3) What type of computer use is being required in coursework? (4) Do students feel they have adequate access to the computing facilities they need? (5) What are the primary and secondary uses of a computer? and (6) How often do students use the technology for e-mail communications, word processing, spreadsheets and databases, Internet searching, distance education and other applications?

A questionnaire was developed and distributed to selected classes on campus. The freshmen surveyed were enrolled in a beginning English class and the seniors were enrolled in senior seminars or other senior level cap-stone classes. The senior classes were selected to ensure that each of the four colleges at MSU was represented. The questionnaires were distributed to the classes, collected, organized and the data analyzed using a Chi-

square. Information from the six subordinate questions was analyzed to answer the primary research question.

The results of this study showed that there appears to be a significant difference in computer usage patterns between freshmen and senior students at MSU during the Spring semester of 1999. Not only did this study show a significant difference in the overall usage patterns between the two groups, but differences were also found in the type of software applications each group used, the frequency of use, and the amount of courses requiring the use of a computer. No significant difference was found in the primary and secondary uses of a computer between the two groups. The primary reason for using a computer was for course work and the secondary reason was browsing the Internet.

Similarities in usage patterns between the two groups were also found. For example, students in both groups indicated a preference for software developed by the same manufacturer. The two most frequently used software applications in both groups were word processing and electronic mail. Most students also felt they had adequate access to the computer facilities they needed.

Accepted by: _____ Chairman

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Graduate School
Morehead State University
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Accepted by the graduate faculty of the College of Education

And Behavioral Sciences, Morehead State University, in

Partial fulfillment of the requirements for the

Education Specialist Degree in

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TABLE OF CONTENTS

INTRODUCTION....1

Problem Statement....1

Significance of Study....2

History of Computers at MSU....4

MSU Student Population....5

Definition of Terms....7

Justification of Study....8

Research Questions....10

Hypotheses....11

REVIEW OF LITERATURE....13

General....13

Higher Education....16

Summary of Literature Review....23

METHODOLOGY....24

Population....24

Instrumentation....26

Procedures....27

Data Collection....28

Data Analysis Procedures....29

RESULTS....31
Analysis of Primary Research Question....31
Test of Hypothesis 1....32
Test of Hypothesis 2....36
Test of Hypothesis 3....37
Test on Hypothesis 4....37
Test of Hypothesis 5....38
Test of Hypothesis 6....40
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS....46
Summary....46
Conclusions....50
Recommendations....57
Suggestions for Further Study....59
REFERENCES....63
APPENDICIES....65
Appendix A....66
Appendix B....70
Appendix C....71
Appendix D....72

LIST OF TABLES

Table 1	Survey Results - Totals	72
Table 2	Total Usage Patterns of Computer Facilities	31
Table 3	Use of Word Processing Programs	32
Table 4	Use of Spreadsheet Programs	33
Table 5	Use of Presentation Programs	33
Table 6	Use of Database Programs	34
Table 7	Use of Internet Browsers	34
Table 8	Use of Web Page Development Software	35
Table 9	Use of Programming Languages	35
Table 10	Required Use of Computer in Coursework	36
Table 11	Adequate Access to Needed Computer Applications	37
Table 12	Type of Computer Use Required in Courses	38
Table 13	Primary Use of Computers	39
Table 14	Secondary Use of Computers	39
Table 15	Frequency of Use: E-Mail	40
Table 16	Frequency of Use: Word Processing	41
Table 17	Frequency of Use: Spreadsheets	41
Table 18	Frequency of Use: Databases	42
Table 19	Frequency of Use: Presentation	42
Table 20	Frequency of Use: Internet Browsers	43

Table 21 Frequency of Use: Web Page Development....44

Table 22 Frequency of Use: Programming Applications....44

Table 23 Frequency of Use: Distance Learning....45

Table 24 Frequency of Use: Other....45

INTRODUCTION

Computers began to make their way into educational facilities in the mid to late 1980's and their uses and numbers have been increasing since that time. Today some type of discussion about the use of computers in schools is in almost every issue of educational magazines and newspapers on the market. Government, schools and school districts have spent millions of dollars in an effort to bring technology into the classroom. This incorporation of technology, in addition to costing millions of dollars, has brought advantages and disadvantages, answers and questions, and challenges and opportunities.

Problem Statement

Over the past 15 years, the number of computers and computer applications used in education has grown at a dynamic rate. Not only have the number of computers available for student use increased, but the power and speed of these machines have also increased. Areas of technological advances in education are also growing to include distance learning via compressed video and the use of the Internet as teaching and communication tools.

Morehead State University has spent millions of dollars over the past several years to make technology available to students, but no studies have been performed to determine how students are using the technology. Usage statistics are kept in the labs, which show that students do use the

technology facilities; however, more detailed information on usage patterns and trends would allow for more informed and effective planning and purchasing.

With all of the financial support being given to assure accessibility to technology on campus, several questions are being raised. How are the students at MSU using the technology resources available to them? What software applications are being used? What type of technology and software applications are faculty members requiring students to use? Do students have adequate access to the technology they need to complete their academic assignments? Are the technology resources available to students being used in an effective and efficient manner? Are the students reaping the benefits from the major expenditure on technology? As a student becomes familiar with basic computer application software, do they move on to use more advanced applications and features? Do student usage patterns change as they progress through their program of study?

Significance of Study

This study attempted to determine how students were using the technology resources currently available to them and to determine any technology needs of students that were not being met. The results of this study could lead to more effective technology planning and more efficient use of the University's financial resources. This study addressed questions regarding the use of specific software applications, both type and frequency;

accessibility to resources; reasons for using the technology resources; the amount of required computer usage in courses; the use of distance learning facilities and the use of the Internet.

A purpose of this study was to determine if there were any difference in computer usage patterns between freshmen and senior students at Morehead State University (MSU), in the spring semester of 1999. In order to determine this, usage patterns of each group were examined in several areas including brand name preferences for specific software applications, software applications used, reasons for computer use, frequency of computer use and access to technology facilities.

The population sample used in this study was freshmen and senior students enrolled at MSU during the spring semester of 1999. These two groups of students were selected for two reasons. First, by surveying the entering freshmen and graduating seniors, differences in the usage of specific software applications and programs, the frequency of computer use, and the required use of software for each individual group could be determined. Secondly, by surveying these same groups, a comparison in the usage of software applications, frequency of use and required use of technology in coursework between the two groups could be made. As students progress in their education, does the use of technology change in any way?

History of Computers at Morehead State University

Because this study attempted to address questions concerning student use of computer at MSU, a brief review of the history of computers at MSU is included. In order to plan effectively for the future, we need to know how the institution accumulated the technology currently available to students and MSU's current position in providing technology to students.

Jones (1999) stated that prior to the early 1980's there were few computers in use at Morehead State University (MSU). There were approximately 50 or so Cordata computers on campus at this time and these were used mostly by the mathematics department.

In the spring of 1987, the administration realized that MSU was lagging behind in technology available on campus and a committee was formed to address the problem. As a solution to this problem and to bring MSU into a technology leadership role, MSU established a computer replacement program in 1993. Patrick (1999) explained that at the time of the inception of the computer replacement program, there were about 1,200 computers listed on the university inventory records. The computer replacement program was designed to replace 1,000 existing computers over a 5-year period or 200 computers every year and allow for the purchase of new computers as well. During the first five years of the computer replacement program (1993-1997) a total of 441 new computers were added to the inventory and 1,000 existing machines were replaced with new technology. A large 100-station open-

access student lab was established in 1996-97 and during the 1997-98 academic year, an additional 81 new machines were purchased and placed in distance learning classrooms and other labs across campus. As of the spring semester of the 98-99 school year, MSU had approximately 1,500 computers listed on inventory records. Not only has the number of computers grown on the campus of MSU, but the capacity of the machines has also increased.

Patrick further explained that beginning with the current year (1999), the computer replacement program at MSU is based on a 4-year replacement cycle, meaning that 25 percent of existing computers on the program will be replaced every year. MSU currently has an annual recurring budget of slightly over $782,000 for technology, with $650,000 for the computer replacement program and the remaining portion set aside for interest payment on the loan and repair and maintenance of the program machines.

According to Patrick, MSU's current ratio of students to computer of 10:1 is the best in the State of Kentucky. This ratio includes computers placed in open-access labs, but does not include desktop technology for faculty.

MSU Student Population

The state of Kentucky and MSU are leaders in bringing educational technology into the classroom. Both the elementary and secondary educational schools in the state and MSU have been successful in this effort

as indicated by the student to computer ratios. The Kentucky Education Reform Act (KERA) has required schools in the State to develop plans for educational technology and bring this type of learning facilities into the primary and secondary schools and classrooms across the state.

KERA was passed in 1990 by the Kentucky State Legislature and brought sweeping changes to the elementary and secondary schools across the state. These changes touched every aspect of the schools: curriculum, accessibility, accountability, governance, professional development and educational technology. Every high school in MSU's 22 county service region adopted the state mandated KERA initiatives, including the initiative dealing with educational technology. Some schools in the regions have more technology resources available to them than others; thus, students arrive at MSU with a variety of technology backgrounds. The majority of both the freshmen and seniors enrolled at MSU during the spring semester of 1999 have been exposed to the technology initiative of KERA for several years. Students in the 1999 graduating senior class at MSU have been exposed to the technology initiative of KERA for over four years, whereas students in the 1999 entering freshmen class have been exposed to this same initiative for over eight years, or about twice as long as the graduating senior class.

Because of the various educational technology facilities in the high schools in MSU's 22 county service region, students arrive at college with a wide range of technological experiences. Most students who obtained their

primary or secondary education in a KERA environment have had some exposure to technology, but this exposure may not have been evenly distributed across the region. For example, non-traditional students returning to college to complete their degrees may have had little or no opportunity to gain exposure to technology where as students from technology advanced schools could have had a significant amount of exposure to various technologies.

Definition of Terms

This section defines the terms used in this project. The definitions are consistently used throughout this project.

Cap-stone class: A class usually taken in the students major area of study during the student's final year at college that brings together the information they have learned throughout their course of study.

Distance learning: The delivery of classes via compressed video, the World Wide Web and/or satellite transmission.

Freshman: A student enrolled in college that has accumulated less than 30 semester hours of college credit.

Senior: A student enrolled in college that has accumulated at least 90 semester hours of college credit

Technology: The use of computers, educational software, multi-media applications, and distance learning facilities.

Justification for Study

The use of technology in education is here to stay and is increasing in all levels of education. Dramatic increases in the number of computers and financial commitments to obtain educational hardware and software has been seen in both elementary and secondary schools and colleges and universities. The current ratio of students per computer at the elementary and secondary school level has fallen from 125:1 to an average of 12:1 nationwide. As previously stated, the current ratio of students per computer at MSU is 10:1.

The use of technology has been shown to have the following impact in schools.

- Improve student performance as indicated by test scores
- Improve communication between students and teachers
- Foster communication between the teachers, the school and the community
- Reduce the distance and time barriers to education
- Assist students in developing marketable job skills
- Provide additional resources for use in classrooms and for research and exploration

- Promote changes in attitudes of students towards learning
- Promote administrative efficiency

Current use of technology in education includes teaching courses via compressed video, using the Internet as a research and information resource, and providing electronic mail as a form of communication. Computer networks also provide connectivity to other educational institutions, private companies, governmental agencies and resources, libraries and museums, and other documents, information, and agencies. Local area networks provide word processing, spreadsheet, database, and programming applications for faculty, staff and students and Wide area networks make communication and information sharing possible between schools and departments.

Not only is the number of computers in schools increasing but the dollars spent on instructional software is also increasing. Funding for upgrades, new software applications, supplies, maintenance and licenses will remain an ongoing cost that must be addressed in the annual operating budget of the schools.

The State of Kentucky is a leader in bringing technology into the school systems. The United States Department of Education, the Kentucky Department of Education and the Council on Post Secondary Education have strongly promoted and supported technology in schools by funding a large portion of the cost of bringing technology into the schools in Kentucky. State

leaders realized that in order for technology to have the fullest impact on education, each student, faculty member and administrator must have adequate access, support, and training in using technology to develop their skills. In order to achieve this goal, the state has provided funds for support and training for faculty, staff and administrators.

The goal for the student to computer ratio for Kentucky's elementary and secondary schools is 6:1 and the current ratio is an average of 8:1, much closer to the goal than other states. Technology standards have also been adopted in teacher education programs at Colleges and Universities in the state, thereby ensuring that new teachers have the background in technology that they will need to perform in the classrooms of today and tomorrow.

Research Questions

This research study was designed to obtain information to answer the following primary research question (RQ). Are there any differences in the usage patterns between freshmen and seniors? In order to obtain data to answer this research question it was necessary to break the research question down into several supportive questions and develop hypotheses based on these questions; therefore RQ2 through RQ7 were developed. After the data on RQ2 through RQ7 had been accumulated and analyzed, these results were then summarized and analyzed to answer the primary research question.

RQ2. What software applications are being used by the students at MSU?

RQ3. What percentage of courses at MSU are requiring the use of a computer?

RQ4. What type of computer use is being required in the students course work?

RQ5. Do students feel that they have adequate access to the computing facilities they need?

RQ6. What are the students primary and secondary use of computers?

RQ7. How often do students use technology resources for E-mail communications, word processing applications, spreadsheet and database applications, searching the Internet and distance learning?

Hypotheses

In order to answer the primary research question in this study the following six supportive null hypotheses were developed.

1. There is no difference in the type of software applications used by MSU freshmen and seniors.
2. There is no difference in the percentage of courses requiring the use of computers between freshmen and seniors at MSU.
3. There is no difference in how the MSU freshmen and senior students feel about adequate access to the computing facilities

they need.

4. There is no difference in the type of computer use required in course work between freshmen and seniors at MSU.
5. There is no difference in the primary and secondary use of computers by MSU freshmen and seniors
6. There is no difference in the frequency of use of various computer applications at MSU between freshmen and seniors.

REVIEW OF LITERATURE

The review of literature for this project examined the use of computers in general education and in Higher Education institutions in this country. The literature reviewed showed a dynamic increase in support and funding to bring educational technology into the classrooms and the different ways that computers were being used by students and teachers.

General

Staman (1990) stated that prior to the mid 1980's, there was little use of computers in the classroom; however, during the mid 1980's computers became more powerful in operating capacity and more affordable, thus more suitable for classroom use. Software applications had also become more user friendly and allowed the user to focus on the content of the task at hand rather than the technical ins and outs of the computer or the computer software language. Castner (1997) stated that "there is no better tool that can be used in the education of a person than the computer" (p.2).

Much of the current discussion in literature regarding technology in education involves the establishment of network access and telecommunication infrastructure and distance education initiatives. Other areas of concern are training for teachers and administrators, and support and assistance issues of developing and maintaining curriculum and instructional materials for use in the classroom and distance learning

facilities. The original development time of technology based materials is high, but the payoffs are large.

Spradley (1993) stated that distance education is another fast growing application of technology in education. Distance education includes courses offered via compressed video and the Internet. Advances in technology have enabled universities to make education more accessible, efficient, and effective in the future. Even though the use of distance education is in an early stage of development, it requires the use of computer facilities, both for the student and the institution. The use of technology in distance education has played a key role in overcoming the barriers of distance and convenience that are faced by many learners. Using technology to meet these objectives will continue to be one of the future challenges for Higher Education institutions.

A 1999 report by the Software and Information Industry Association stated that during the school year for 1997-98, schools and districts spent approximately $2.1 billion on instructional computers in grades K-12, and approximately $5 billion on educational software. Similar spending patterns were also seen in Higher Education where approximately $986 million was spent for academic hardware and $394 million for instructional software.

Public officials and legislative leaders have required institutional efficiency, equal access for all students and realize that basic computer use skills have become a necessity for all students. The use of technology has

grown not only in the educational classrooms, but has become more common place in the home and in the workplace. Students in school today have been exposed to a variety of technology applications that have caused their expectations of education to change. Now most schools, at all levels, have at least one connection to the Internet.

This introduction of the Internet has brought about many changes in the use of computers in educational facilities. Sterling (1993) stated that "the Internet grew from a 1960's effort by the United States Department of Defense to create a multi-section network that could be used for communications in the event of a disaster" (p. 1). This network was developed by the National Science Foundation and was designed to allow communications to take place even if one section of the network was destroyed. Although this network, the Internet, originally linked US scientific and academic researchers, it has grown to include a collection of other resources, including research materials, instructional aids, news groups, government and legislative information. Many government agencies, companies, school and individuals now have Web Pages that can be accessed via the Internet. The Internet has also brought the capability to view on-line demonstrations and the ability to perform long-distance computing.

The 1999 report by the Software and Information Industry Association also shows that in 1990-91 most elementary and secondary schools did not

have access to the Internet, but by 1998 approximately 87 percent of all K-12 schools in the United States had at least one Internet connection and about 44 percent of all classrooms in K-12 schools were connected to the Internet. By 1998, most Higher Education campuses had access to the Internet and about one-third of these campuses reported using the Web as a resource tool. Approximately 25 percent of the Higher Education campuses stated they had developed a plan for using distance learning capabilities in the near future.

Higher Education.

Technology in Higher Education encompasses using computers and network systems to deliver material, to teach classes, to exchange mail, to search the World Wide Web, to make application programs available, to develop and deliver distance learning courses, and to provide word processing, spreadsheet and database programs for student use. Technology is also used for student service functions. Many colleges and universities now have the capability of registering students via the World Wide Web.

A report published by the Software Publishers Association in 1996 stated that as of December 1994, there were approximately 9.3 million computers installed in 4,200 colleges and universities in the United States.

The report also addressed several studies supporting the use of technology as a tool for learning. Evidence in these reports indicated that the

measurable difference in student achievement is dependent upon several factors including the level of access to technology facilities. The role of computers for instructional applications in higher education in this country will continue to increase and expand.

A 1989 nation-wide survey of colleges and universities was conducted by White and Righi (1991) to identify the types of software used in an institution of higher education; to examine usage patterns and to identify those programs most useful to the students. In their study, two institutions of higher education were selected from each state and the District of Columbia. Questionnaires were mailed to the Manager of Academic Computing at the 102 Colleges and Universities selected. Fifty questionnaires were returned from 32 states and the District of Columbia.

According to their study, the most popular software applications were: (a) WordPerfect, Word, and MacWrite for word processing, (b) Lotus 123 and Excel for spreadsheet applications; (c) Pascal and Basic for programming languages and (d)Dbase for database applications. Their study indicated that a wide range of software packages were popular with students and that students used a wide variety of software packages in each category, therefore, only the top two or three packages in each category (one for database) were listed. Efforts to address usage patterns of the students in their study proved unsuccessful because each student used a great number of computer applications for different purposes.

According to the researchers, the most striking result of their study was the enormous range of software packages that were reported as being popular with students. Their study also found that cross over packages, meaning that the software would run on more than one operating system, were most popular.

The study by White and Righi was conducted in 1991 and at that time, most universities were using BITNET. The World Wide Web and the Internet were in their early stages of development and generally not available to educational institutions on a wide scale basis. Their study showed that there existed a lack of research tools available to students to help them write research papers, but did mention that BITNET and on-line library services were beneficial for this purpose but using them required extensive networking systems in addition to owning or having access to a computer.

The main objective of a study by Chrisler, White and Morressey (1989), was to address the attitudes of students toward the use of computers, and to obtain data related to the use of computers at the college. In their study, a questionnaire, containing 32 questions, was sent to 200 participants and gathered information about the purpose of use, the frequency of use, and their attitudes towards using a computer.

They found that word processing was the most common use of a computer and 51% of the respondents said that they had been required to use a computer in their college course work. The courses listed as requiring

the most frequent use of a computer were computer science classes, but when asked what majors were associated with the use of computers, the respondents indicated 21 different subject areas, ranging from anthropology to music. Nineteen percent of the respondents remarked that computers were used in every major.

Similar results were seen in a study conducted by Caporeal (1985) on college student computer use. Her study was designed to determine how students used computers and time allocated to using a computer. Her study was a 2-year study and involved two cohorts with each cohort subdivided into three groups. The groups were, (a) scholarship students that were awarded a computer; (b) students that did not own a personal computer, but had similar SAT scores similar to the scholarship group and (c) students who owned a personal computer but did not have similar SAT scores to those in the scholarship group.

Students in both cohorts were asked to keep a journal of their time spent on various activities, including computing time, over a three-day period. Analysis of the information in the journals indicated that the scholarship students spent significantly more time on computing activities than those students who did not own a computer, but no difference was found between the scholarship group and the non-scholarship group of students who owned a computer. Her study also showed that across both cohorts "students who

owned computers showed a small but significant inverse correlation for time spent studying and computing" (p. 177).

Another important conclusion of her study showed that the amount of time a student spends on a computer depends on access to hardware. Over 50 percent of the students in her study indicated that they had modems and use the computer facilities via the modem an average of 8.5 hours/week.

The Caporeal study also showed that students used a computer mostly for homework. This included the use of both the mainframe system and personal computers. The second most frequent category of use was gaming. The non-scholarship, computer-owning group accounted for the majority of the gaming activity. Computer science classes required the largest amount of computer time with science classes ranking second, but a computer was used by students in other classes to write reports and do other class assignments.

The fact that a computer has become a necessary educational tool for college students is quite evident. McCollum (1998) stated that "overcrowding in computer labs is a familiar complaint on the campus of the University of Florida" (p. 29). Students at this university stated that they have plenty of reasons to get on line and use a computer. In the fall semester of 1998, the University of Florida instituted a requirement that students either own or have access to a computer powerful enough to search the World Wide Web. Some students said that every class they had taken has had a web site while

others indicated that they take practice quizzes and perform research via the web. Others used e-mail to communicate with fellow students and professors. The students also indicated the need for word processing capabilities for most of their coursework.

Turner (1987) reviewed and discussed a study conducted by EDUCOM. The survey for the EDUCOM study consisted of a 12-page questionnaire which was sent to 450 colleges and universities that were members of EDUCOM. According to the review, the study found that the major use of a computer by faculty, staff and students at these institutions was word processing. Forty percent of respondents in each category (faculty, staff, and students), ranked word processing as their major use of a computer. Other popular uses of a computer by students included, spreadsheet applications, statistical packages and the use of freeware.

The EDUCOM study stated that many institutions purchased computers for student use on campus. These computers were generally placed in laboratories and each student had access to one of these computers an average of 3.3 hours per week. Access to computing facilities is an important factor in student use. Perhaps many students felt that the 3.3 hours per week was not enough computer time because the study also showed that students in professional or graduate school were more likely than undergraduates to own a computer, but approximately 13 percent of all students, at the institutions surveyed, owned a computer.

Hunt and Bohlin (1991) surveyed 518 students enrolled in a teacher education computing course for classroom teachers at California State University. These students were asked how many times they had used a computer for word processing, spreadsheet analysis, database analysis and recreation. Word processing applications had the highest number of uses with recreational applications ranking second. Programming applications ranked third while database programs and spreadsheet applications ranked fourth and fifth respectively.

A study by McLaney and Thurman (1988) was conducted at the University of Massachusetts at Amahurst in 1988 to determine the key factors in the use and frequency of use of microcomputers by college students. Their study investigated how computers were used by undergraduates, such as for word processing, spreadsheet development and programming. The study was conducted by selecting, at random, 308 undergraduate students and conducting a telephone interview with each student. The conclusion of their study pointed out that access to computing facilities was the number one variable in determining which students used computers and which did not. Other variables shown to have an impact on use were the student's career choice or area of study and prior use of a computer in high school.

Although their study did show variables indicating who used computers, it was inconclusive in determining any correlation between the variables and the frequency of use of a computer.

Summary of Literature Review

The number and capacity of computers used in education has increased over the past 10 to 15 years and now almost every school in the nation has a connection to the Internet. Millions of dollars have been spent by federal, state and local governments to bring computer technology into the classrooms and to provide training in using them

The 1986 Software Publishers Association report, the 1985 Caproeal study and the 1987 study by Turner show that access to computing facilities was an important factor in student computer use. McLaney and Therman (1988) reported that access to computer facilities was the number one variable in determining which students used computers.

Word processing was the most common use of a computer as mentioned in the 1989 study by Chrisler, White and Morressey and the 1991 study by Hunt and Bohlin. Other uses of computer applications were for programming, spreadsheets, electronic mail, gaming, and on-line courses. Several studies also indicated that the use of a computer was required in almost every college course. Computer information classes ranked number one in the required use of a computer, but classes in science, math, music, and others, also required the use of a computer.

METHODOLOGY

In order to answer the research question of this study, two groups of MSU students, freshmen and seniors were surveyed. The freshmen surveyed were selected from a beginning English course and the seniors were selected from classes in each of the four colleges at MSU.

This study used cluster sampling to select the participants, and the data collected consisted of frequency counts. Because frequency counts were the main type of data for this study, a Chi square was used to analyze the data.

This project required working with students and therefore had to be approved by the MSU Institutional Review Board (IRB) for the Protection of Human Subjects in Research. A brief description of this project and a copy of the questionnaire were attached to the appropriate forms and submitted to the Board. This project was approved by the IRB.

Population

The sample in this study was 236 students enrolled at MSU during the spring semester of 1999. Both male and female, caucasian and non-caucasian, traditional and non-traditional students were represented in this sample. The students surveyed were currently taking classes on campus and did not include any students taking the surveyed classes at the extended campus facilities.

Eleven sections of ENG 100 were selected from the course catalog and 117 students were surveyed in these sections. ENG 100 is a beginning freshmen English class taken by most freshmen. Of the 117 surveys collected from this group, 113 contained usable data.

A total of 108 usable responses were obtained from senior students. The senior courses surveyed were selected from senior classes from each of the four colleges at MSU. The four colleges are: the College of Humanities, the College of Science and Technology, the College of Business and the College of Education and Behavioral Sciences.

The senior classes selected to be surveyed were cap-stone or other upper level classes that consisted mainly of senior students. In the College of Business, the class surveyed was a senior-level marketing class, which yielded 24 responses. In the College of Humanities, two senior seminar cap-stone classes were surveyed. The first class surveyed was the senior Seminar in Electronic Media (7 responses), and the second one was the senior Seminar in Communications (21 responses), for a total of 28 responses from this college. From the College of Science and Technology, a senior level class for elementary science teachers was surveyed resulting in 22 responses. In the three colleges mentioned above there were no unusable responses. Four classes were surveyed in the College of Education and Behavioral Sciences. Two sections of an upper-level class in Learning Theories for Teachers yielded 24 total responses of which 20 were

usable. The other two classes surveyed were two sections of an upper-level class in Teaching and Media skills. A total of 21 responses were gathered from this group of which 14 were usable. The total number of usable responses from the College of Education was 34. The total number of senior students surveyed for this study was 119.

Instrumentation

The questionnaire used in this study was generated by the researcher and contained two main sections. Each section of the questionnaire contained a number of questions and sub-sections. The questionnaire was simple, required less than 15 minutes to complete with each question constructed so that the respondents could simply check the item that applied to them.

The first section of the questionnaire asked questions regarding the student's use of a variety of computer software and programming applications. Students were asked which brand name software packages they used for several application programs including word processing, spreadsheets, presentations, databases, Internet browsers, web page creation and programming. This information was analyzed to determine if any brand name software preferences existed for both the freshmen and senior groups and to determine whether there were any differences in these brand name preferences between the two groups.

The second section of the questionnaire was designed to obtain information on the student's use of technology. In this section students were asked for information about the types of computer programs used (not brand names), the frequency of use, the amount and type of technology that teachers required for coursework and the students' access to the needed technology. Data from this section of the questionnaire were analyzed to determine usage patterns of technology by the freshmen and senior groups and to determine if any differences in usage patterns existed between the two groups. A copy of the questionnaire is in Appendix A.

Procedures

The Dean of each of the four colleges at MSU was contacted by telephone. This project was discussed with them and permission was requested to contact the various Department Heads within the college. The four Deans of the Colleges granted permission to proceed. The Department Heads within the colleges were contacted, the research project was discussed and permission was requested to contact individual faculty members within the departments. Permission to proceed was granted from the Department Heads.

The sample of 117 (113 usable) freshmen students were selected from the ENG 100 classes. Because students in several sections of this course were needed to obtain the selected sample size, a meeting with the head of the department was established. In cooperation with the Department Head, a

sample of ENG 100 course sections was selected from the course schedule as possible classes in which to distribute the survey. Permission from the instructor of each class selected was obtained before the questionnaire was distributed to the students.

Each instructor was contacted by telephone and arrangements made as to the day, time, and location of the classroom for the distribution of the questionnaire. Two instructors chose not to allow their students to participate in the survey because they had prior plans for their students during the three-week period in which this survey was conducted.

Data Collection

The questionnaire was taken to the various classrooms over a three-week period at the scheduled times and locations. Prior to distributing the questionnaire, a letter (Appendix B) was read to the students. This letter indicated the purpose of the study and told the students that their participation in this study was completely voluntary and that they did not have to complete the questionnaire or could withdraw from the study at any time. Each student who chose to complete the questionnaire was asked to sign a consent form (Appendix C), which was attached to the front of the questionnaire, and return it along with the completed questionnaire. For students in the ENG 100 class, drivers licenses were checked to ensure that each participant was at least 18 years of age or older. If a student could not

prove that they were at least 18 years of age, they were not permitted to complete the survey.

After the questionnaires were completed by the students, they were collected and reviewed. Once the questionnaire had been reviewed, the consent form was removed from the front of the questionnaire. All completed questionnaires and consent forms were filed and kept in a locked office.

The responses to the survey questions from each group of students were entered into a spreadsheet along with any notes or comments made by the students. Separate entries were made for the surveys completed each week. A total for each group surveyed, freshmen and seniors, was calculated at the end of the three-week period and entered into the spreadsheet shown as Table I in Appendix D.

Data Analysis Procedures

The data collected in this study consisted of frequency counts from the questionnaires. There were 221 usable questionnaires completed by freshmen and senior students enrolled at MSU during the spring semester of 1999. Since the type of data collected in this survey was frequency counts, a Chi square was used to analyze the data. The Chi square test is a non-parametric test in which the variables are arranged by category. A probability level of .05 was selected to determine whether there was a significant difference in each of the hypotheses proposed in this study.

There were six supportive hypotheses in this study and a primary research question. The six supporting hypotheses were analyzed and the results combined to answer the primary research question in this study. The test of the six supporting hypotheses showed information about the use of various types of software applications, frequency of use, required use for coursework, primary and secondary uses of computers and access to computing facilities for both of the two groups. The data used to answer the primary research question consisted of a summation of the answers given to the six supporting hypotheses. The answers given by each group of students were summarized separately so that any difference in overall usage patterns of freshmen and seniors could be determined.

RESULTS

There were six hypotheses tested in this study in order to answer the primary research question. A table containing the survey results can be found in Table 1 in appendix A.

Analysis of Primary Research Question

The primary research question asked whether or not there is a difference in the usage patterns of technology between freshmen and seniors at MSU.

Table 2- Total Usage Patterns of Computer Facilities

Frequency of Use	Seniors	Freshmen	Total
More than once a day	64	82	146
Once a day	90	67	157
More than once a week, but less than once a day	116	148	264
Once a week	85	55	140
More than once a month, but less than once a week	90	125	215
Once a Month	58	45	103
Less than once a month	175	158	333
Never	316	418	734
Total	994	1098	2092

A significant difference in the overall useage patterns of computer facilities between MSU freshmen and seniors was indicted, $X^2(7, 2092) = 33.1885$, $p < .05$. Significant differences were found in the of use of various application software packages, the frequency of use, and the amount of required use in coursework. Of the 22 items on the survey questionnaire, ten items showed a significant difference.

Test Of Hypothesis #1

The first subordinate hypothesis of this study stated "there is no difference in the type of software applications used by freshmen and seniors."

To answer this hypothesis, it was necessary to examine the usage patterns of several different types of software applications. The first type of software application considered was word processing.

Table 3 - Use of Word Processing Programs

Name of Software	Seniors	Freshmen	Total
Microsoft Word	90	87	177
Microsoft Works	64	64	128
Word Perfect	42	40	82
Other	9	2	11
None	1	1	2
Total	206	194	400

This data showed no significant difference in the word processing software applications used by seniors and freshmen, $X^2(4, 400) = 4.1980$ $p < .05$. The three most popular word processing programs used by the students were Microsoft Word, Microsoft Works, and Word Perfect. Students also mentioned using Claris Works and WordPad.

Table 4 - Use of Spreadsheet Programs

Name of Software	Seniors	Freshmen	Total
Microsoft Excel	77	63	140
Lotus 123	13	7	20
Quattro Pro	2	2	4
Other	1	2	3
None	21	27	48
Total	114	101	215

This distribution of data did not indicate a significant difference, X^2 (4, 215) = 3.5101, $p < .05$. Both freshmen and senior students indicated using Microsoft Excel more than any other spreadsheet application. Approximately one fourth of both freshmen and seniors indicated that they did not use any spreadsheet program.

Table 5 - Use of Presentation Programs

Name of Software	Seniors	Freshmen	Total
Microsoft Power Point	79	50	129
Astound	0	3	3
Other	3	13	16
None	22	40	62
Total	104	106	210

This data indicated a significant difference in the usage patterns of presentation software applications between freshmen and seniors, X^2 (3, 210) = 20.0780, $p < .05$. More senior students used presentation software than did freshmen. While both groups of students indicated a preference for using Microsoft PowerPoint, freshmen also used other packages.

Table 6 - Use of Database Programs

Name of Software	Seniors	Freshmen	Total
Microsoft Access	36	46	82
Dbase	8	7	15
Lotus Approach	3	5	8
Other	3	5	8
None	44	50	94
Total	94	113	207

No significant difference was indicated between freshmen and seniors in the use of database programs, X^2 (4, 207) = .9331, $p < .05$. Both freshmen and seniors indicated a preference for Microsoft Access as a database program, but nearly one-half of the students surveyed in both groups stated that they had not used any database program. Quick Books was also a program listed as being used by students as a database program.

Table 7 - Use of Internet Browsers

Name of Program	Seniors	Freshmen	Total
Netscape	97	96	193
Internet Explorer	61	71	132
Other	3	0	3
None	0	3	3
Total	161	170	331

No significant difference was indicated in the use of Internet browsers, X^2 (3, 331) = 6.5230, $p < .05$. The two Internet browsers used most by the students were Netscape and Internet Explorer. AOL was the only other program students indicated using for browsing the Internet.

Table 8 - Use of Web Page Development Software

Name of Program	Seniors	Freshmen	Total
FrontPage	16	19	35
Page Composer	14	9	23
Other	31	5	36
None	57	74	131
Total	118	107	225

The Chi-square regarding the use of web page development software between freshmen and seniors indicated a significant difference X^2 (3, 225) = 21.8242, $p < .05$. The data showed that more seniors than freshmen used web page development software programs, but almost one-half of the students surveyed in each group reported that they did not use web page development software. Several students (23) also stated they used Adobe Page Mill (19) and AOL Press for creating web pages.

Table 9 - Use of Programming Languages

Name of Program	Seniors	Freshmen	Total
Basic	30	29	59
C++	1	3	4
Java	18	25	43
Fortran	1	1	2
Cobol	1	2	3
Other	1	26	27
None	63	35	98
Total	115	121	236

The Chi-square on programming languages data indicated a significant difference, X^2 (6, 236) = 33.5051 $p < .05$. The two most popular

programming languages were Basic and Java. The data indicated that freshmen students were using more programming languages than seniors.

Test Of Hypothesis #2

The second subordinate hypothesis of this study stated "there is no difference in the percentage of courses requiring the use of computers between freshmen and seniors."

Table 10 - Required Use of Computers in Coursework

Percentage of Required Use	Seniors	Freshmen	Total
Over 75% of the time	64	32	96
Between 50% and 75%	25	38	63
Between 25% and 50%	11	27	38
Less than 25%	4	12	16
Never	1	1	2
Total	105	110	215

The distribution of this data showed a significant difference, $X^2(4, 215) = 23.9821$, $p < .05$. While both freshmen and senior students indicated that the use of computers was required in over 50 percent of their coursework, the seniors reported that a larger percentage of their courses required the use of a computer.

Test Of Hypothesis #3

The third hypothesis stated that "there is no difference in how MSU freshmen and senior students feel about adequate access to the computing facilities they need.

Table 11- Adequate Access to Needed Computer Applications

Rating of Access	Seniors	Freshmen	Total
I have access to everything I need	31	48	79
I have access to almost everything I need	62	54	116
I have access to part of what I need	8	7	15
I have access to very little of what I need	3	0	3
I don't have access	0	1	1
Total	104	110	214

This distribution did not show a significant difference, $X^2(4, 214) = 8.1148$, $p < .05$. Both freshmen and senior students at MSU felt they had adequate access to the computer applications they needed to complete for their coursework.

Test Of Hypothesis #4

The fourth hypothesis of this study was used to determine whether or not there was a significant difference in the type of computer applications students needed to complete their coursework.

Table 12 - Type of Computer Use Required in Courses

Type of Program Required	Seniors	Freshmen	Total	
E-Mail	88	98		177
Word Processing	98	95		193
Spreadsheets	47	50		97
Database	17	22		39
Presentation	65	37		102
Internet Searching	87	85		172
Web Page Creation	44	7		51
Programming	7	5		12
Distance Learning	11	2		13
Other	12	1		13
Total	476	393		869

No significant difference was indicated in the type of computer applications required for coursework between freshmen and seniors, X^2 (9, 869) = 43.6815, $p < .05$. Although both groups of students indicated the use of word processing, electronic mail and Internet searching were required for coursework, the senior students were also being required to use presentation and web page development.

Test Of Hypothesis #5

The fifth hypothesis of this study was concerned with the primary and secondary use of the computers by MSU freshmen and seniors, and stated that there was no significant difference between the two groups regarding the primary and secondary reasons for using the computer facilities.

Table 13 - Primary Use of Computers

Type of Use	Seniors	Freshmen	Total
School Assignments	88	83	171
Browsing the Internet	30	34	64
E-Mail to friends and family	32	36	68
Creating Web Pages	4	5	9
Programming	0	3	3
Games	10	18	28
Chatting	3	11	14
Other	3	1	4
Total	170	191	361

The data in the table above indicated that there was not a significant difference in the primary use of a computer between freshmen and senior students, $X^2(7, 361) = 10.4134$, $p < .05$. Both groups of students indicated they used the computer facilities primarily for school assignments.

Table 14 - Secondary Use of Computers

Type of Use	Seniors	Freshmen	Total
School Assignments	22	26	48
Browsing the Internet	41	41	82
e-mail to friends and family	29	39	68
Creating Web Pages	2	2	4
Programming	2	3	5
Games	20	20	40
Chatting	7	10	17
Other	3		3
Total	126	141	267

The data in table 14 did not show a significant difference in the secondary use of computer applications between freshmen and seniors, X^2

(7, 267) = 4.7055, $p < .05$. The data showed that both groups stated that browsing the Internet was their secondary use of a computer. This was followed by e-mail to friends and family.

Test Of Hypothesis #6

The sixth hypothesis of this study was to determine if there were differences in usage patterns between freshmen and seniors regarding the frequency of use of the various applications available to them. The frequency of use for several applications was considered.

Table 15 - Frequency of Use: E-Mail

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	33	36	69
Once a day	35	22	57
More than once a week, but less than once a day	25	19	44
Once a week	5	4	9
More than once a month, but less than once a week	1	8	9
Once a month	3	3	6
Less than once a month	5	5	10
Never	0	7	7
Total	107	104	211

The above data indicated a significant difference in the frequency of E-Mail use, $X^2(7, 211) = 16.430$, $p < .05$. Although the majority of students in both groups reported using e-mail at least more than once a week, senior students indicated using e-mail more frequently.

Table 16- Frequency of Use: Word Processing

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	0	5	5
Once a day	28	10	38
More than once a week, but less than once a day	21	44	65
Once a week	47	14	61
More than once a month, but less than once a week	2	23	25
Once a month	4	4	8
Less than once a month	0	3	3
Never	1	4	5
Total	103	107	210

This data indicated a significant difference, $X^2(7, 210) = 61.9035$, $p < .05$. Overall senior students used word processing software more frequently than freshmen, but the majority of students in both groups used a word processing program at least once a week.

Table 17 - Frequency of Use: Spreadsheet

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	2	1	3
Once a day	1	1	2
More than once a week, but less than once a day	1	112	13
Once a week	4	8	12
More than once a month, but less than once a week	23	20	43
Once a month	13	5	18
Less than once a month	33	26	59
Never	29	34	63
Total	106	107	213

A significant difference was indicated in the frequency of use of spreadsheet programs between freshmen and senior students, $X^2(7, 213) = 15.4622$, $p < .05$. The majority of both groups reported using spreadsheet

programs less than once a week, but senior students used the programs more frequently than freshmen. Almost one-third of the freshmen students indicated that they had never used a spreadsheet program.

Table 18 - Frequency of Use: DataBase

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	0	1	1
Once a day	2	2	4
More than once a week, but less than once a day	3	9	12
Once a week	3	4	7
More than once a month, but less than once a week	13	15	28
Once a month	7	7	14
Less than once a month	24	22	46
Never	55	48	103
Total	107	108	215

This data did not show a significant difference in the frequency of use of database programs between freshmen and seniors, $X^2(7, 215) = 4.8430$, $p < .05$. Approximately one-half of the students surveyed in both groups reported that they had never used a database program.

Table 19 - Frequency of Use: Presentation Software

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	3	2	5
Once a day	0	1	1
More than once a week, but less than once a day	11	2	13
Once a week	5	1	6
More than once a month, but less than once a week	16	19	35
Once a month	14	10	24
Less than once a month	38	27	65
Never	24	44	68
Total	111	106	217

The usage patterns between freshmen and seniors regarding the frequency of use of presentation software also showed a significant difference, $X^2(7, 217) = 18.6598$, $p < .05$. The frequency of usage patterns showed that senior students used presentation software programs more often than freshmen.

Table 20 - Frequency of Use: Internet

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	25	26	51
Once a day	19	17	36
More than once a week, but less than once a day	38	32	70
Once a week	12	11	23
More than once a month, but less than once a week	11	18	29
Once a month	1	0	1
Less than once a month	3	6	9
Never	2	3	5
Total	111	113	224

No significant difference was indicated in the frequency use of Internet browsers between the two groups, $X^2(7, 224) = 4.5606$, $p < .05$. The frequency of usage patterns of the Internet by both freshmen and seniors were similar.

Table 21 - Frequency of Use: Web Page Development

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	1	1	2
Once a day	0	2	2
More than once a week, but less than once a day	2	4	6
Once a week	2	3	5
More than once a month, but less than once a week	6	6	12
Once a month	9	2	11
Less than once a month	48	12	60
Never	38	74	112
Total	106	104	210

This distribution was significant $X^2(7, 210) = 40.4773$, $p < .05$. Senior students are using web page development software more often than freshmen. Approximately 75 percent of the freshmen surveyed indicated that they had never used a web page development software program.

Table 22 - Frequency of Use: Programming Applications

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	0	1	1
Once a day	0	2	2
More than once a week, but less than once a day	1	7	8
Once a week	1	4	5
More than once a month, but less than once a week	2	7	9
Once a month	0	3	3
Less than once a month	14	53	67
Never	38	74	112
Total	56	151	207

This distribution was not significant, $X^2(7, 207) = 7.2863$, $p < .05$. The frequencies of usage patterns of programming applications between freshmen and seniors were similar.

Table 23 - Frequency of Use: Distance Learning

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	1	0	1
Once a day	1	3	4
More than once a week, but less than once a day	3	7	10
Once a week	4	3	7
More than once a month, but less than once a week	3	3	6
Once a month	0	5	5
Less than once a month	5	1	6
Never	86	76	162
Total	103	98	201

This distribution did not show a significant difference between freshmen and seniors in the frequency of use of the distance learning facilities at MSU, X^2 (7, 201) = 11.9098, $p < .05$.

Table 24 - Frequency of Use: Other

Frequency of Use:	Seniors	Freshmen	Total
More than once a day	16	9	25
Once a day	4	7	11
More than once a week, but less than once a day	11	12	23
Once a week	2	3	5
More than once a month, but less than once a week	13	6	19
Once a month	1	6	7
Less than once a month	5	3	8
Never	43	54	97
Total	95	100	195

No significant difference was indicated in "other" uses of computer facilities between freshmen and seniors, X^2 (7, 195) = 10.7984, $p < .05$.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Computers have become a necessary tool in the field of education. The number of computers available for student use has increased at all levels of education. Most elementary and secondary schools as well as colleges and universities are now connected to the Internet.

The State of Kentucky and MSU have made significant expenditures to ensure that students, at all levels, in the state education system have access to computer facilities. The primary and secondary schools in Kentucky have established a computer ratio goal of 6:1 and these schools currently have a ratio of eight students to one computer. MSU is currently leading the state universities in the number of students to computers with a ratio of 10:1.

Usage statistics are kept in the computer labs on campus but there has been no study performed to determine what programs the students use, the frequency of use, the purpose of use, the required use in coursework, or changes in computer use as a student progresses in their education. This study was conducted to answer these questions and to provide additional information regarding student computer use at MSU. This information would be useful in planning for new technology resources and expenditures at MSU.

This study had one primary research question, which addressed the overall differences in student usage patterns between freshmen and seniors and six subordinate hypotheses. Data on the six subordinate hypotheses

were first analyzed separately then the results from each of the six hypotheses were combined and analyzed to answer the primary research question. A significant difference was found in the testing of the primary research question as well as in several of the subordinate hypotheses.

The sample used in this study was 236 students enrolled at MSU during the spring semester of 1999. A total of 113 usable questionnaires were completed by freshmen students and a total of 108 usable responses were collected from the senior students. These two groups were surveyed to gain information about computer usage patterns. By surveying a group of freshmen and a group of seniors, usage patterns for each group and changes in usage patterns from the freshmen year to the senior year could be determined.

The questionnaire was distributed to freshmen students enrolled in selected beginning English classes and to senior students in senior level seminars and other senior level cap-stone classes. The senior classes were selected to ensure that each of the four colleges at MSU was represented in the sample. After the questionnaires were complete, the data was recorded and analyzed using a Chi-square.

A significant difference was found in patterns of usage of computer facilities between freshmen and seniors at MSU. Overall, the data indicated that seniors used the computer facilities and applications available to them more often than freshmen. Significant differences were found in the use of

presentation programs, web page development programs, and programming languages, but no significant differences were found in the use of word processing programs, spreadsheet programs, database programs, or Internet browsers.

Both freshmen and seniors indicated preferences for using the same software package for most applications. For word processing the most frequently used programs were Microsoft Word, Microsoft Works, and WordPerfect. Most students indicated a preference for Microsoft Excel for spreadsheet analysis, Microsoft PowerPoint for presentation development, and Microsoft Access for database development and management. The two most popular Internet browsers were Netscape and Internet Explorer, ranking number one and number two respectively in this category.

For web page development, three software packages appeared as being most common: Front Page, Page Composer and Page Mill. Page Mill was not listed on the questionnaire, but several (19) students indicated that they used the program. The students surveyed also indicated that Basic and JAVA were the two programming languages they used the most. Surprisingly, the data gathered in this study indicated that freshmen students used a wider variety of programming languages than seniors.

A significant difference was also found between the two groups regarding the percentage of coursework requiring the use of a computer. Both groups reported that over 50 percent of their coursework required the

use of a computer, but the seniors indicated a greater percentage of their classes required the use of a computer. The students in both groups also indicated that they had adequate access to the computer facilities they needed to complete their school assignments.

Analysis of the type of computer applications being required in coursework showed no significant difference between the freshmen and seniors. Word processing was the most commonly used program by both groups with electronic mail and Internet browsers ranking second and third respectively. The data also indicated that more senior students were being required to use presentation and web page development software in their coursework.

No significant difference was found between the two groups regarding their primary and secondary uses of a computer. Students in both groups indicated they used the computing facilities primarily for school assignments and secondarily for browsing the Internet.

The sixth hypothesis consisted of several sub-categories regarding the frequency of use of a variety of computer applications. A detailed analysis on the frequency of use of various application software packages showed a significant difference for several applications. These differences were in the use of word processing, spreadsheet, presentation and web page development software. There was no significant difference found in the frequency of use regarding database applications, Internet browsers,

programming languages, distance learning facilities or other uses of computers.

Conclusions

This investigation was concerned with determining how freshmen and seniors, enrolled at MSU during the spring semester of 1999, used the computer technology available to them. This study considered the use of various software application packages, the frequency of use of various software applications, the type and percentage of computer applications required in coursework, the primary and secondary reason for using the computer facilities and access to these facilities.

From the results of this study, the following conclusions were drawn:

1. Students used different types of software packages developed by the same manufacturer. For example, the students in this study indicated preferences for Microsoft programs, such as Word, Excel, Access, and Powerpoint. There are several possible reasons for this preference. One reason could be that students at MSU are more familiar with the Microsoft products and have access to them because these programs are installed on the computers in most laboratories on campus and also pre-installed on the computers purchased through the University's computer replacement program. MSU also supports these programs and teaches them in an introductory computer class. Another reason could be that there are several different versions of programs such as Word, Excel, Access, MS Works and

Word Perfect used by students on campus. The newer versions of these programs allow documents created using an earlier version to be retrieved using a more current version. For example, a document created using Office 95 can be retrieved using Office 97, but this feature does not work in reverse unless the user specifies, when saving the document, how the document is to be saved. Many computer programs developed by the same manufacturer also allow integration between the programs. A spreadsheet created in Excel can be directly imported into Word, Access or Powerpoint without additional formatting or alteration.

2. Electronic mail and word processing were the two most common types of computer applications required in college courses at MSU. Most students used electronic mail more than once a week and word processing programs at least once a week.

This study showed results similar to those found in prior studies which indicated that word processing was a major use of a computer. In this study word processing was also the most often required use of a computer. Word Processing programs can be used in almost every college class and in many disciplines. These programs can be used to create a short, simple document or to create a complex document containing graphics and headings.

This study also showed that electronic mail was another popular use of a computer. The students indicated that the use of electronic mail was

required in some coursework as well as being used as a personal communication tool. Some faculty at MSU are teaching classes via the Internet and electronic mail is a form of communication that both faculty and students use in these classes. The use of electronic mail allows students and faculty to communicate with each other at any time regardless of location. Electronic mail is also more private than classroom discussions. Faculty can counsel students about grades, class progress, and other matters of concern, on a one-to-one basis. Some students may also feel more comfortable asking questions or stating opinions via electronic mail as opposed to the classroom setting.

3. Most college coursework at MSU required the use of a computer. Both groups of students in this survey indicated that the use of a computer was required in over 50 percent of their classes.

The required use of computer at college was also found in other studies. In the study by Chrisler, White and Morresey (1989), it was found that 51 percent of the students indicated that they had been required to use a computer in their coursework. Although this study did not address the required use of a computer by area of study, the students surveyed were selected from several different academic disciplines. Therefore, it stands to reason that the required use of a computer spans across the entire college curriculum.

4. Students at MSU used the computer facilities primarily for school assignments. The secondary use of a computer was for searching the Internet.

Both groups of students surveyed in this study indicated that they used a computer primarily for homework and secondarily for searching the Internet. The results of the 1985 Caporeal study also showed that the number one use of a computer by students was to complete homework. As institutions continue to offer more courses and entire degree programs via the World Wide Web and the Internet, the use of a computer to retrieve, complete and submit assignments will continue to be a significant reason for computer use by college students.

The students in this study indicated that they also used the computer a great deal for searching the World Wide Web. This could be because the World Wide Web makes a large amount of information available to the students. They can search for car prices, addresses, the latest sports scores and almost anything else that interests them. Because the World Wide Web has made so much information available to students via the computer, it can become a valuable tool for conducting research.

5. As students progressed in their level of education, they used computer facilities more frequently and they also used a wider variety of software applications.

This study showed that senior students used electronic mail, word processing, spreadsheet, presentation and web page development software more frequently than freshmen. Reasons for this increase in use could be that as students use computer programs, they become more comfortable with them, learn what they can do, and use them more often.

Computer software aids a student in developing a neat, nice-looking paper and allows the student to work on the paper at their convenience. A student can work an hour or two on the assignment, save it to disk, and return at a later time to continue their work. By saving their work to a disk, the student actually has a portable file that they can retrieve on a different computer at a later time and in a difference location. Most word processing programs also have tools that allow a student to check grammar, punctuation and spelling within the document. Added editing features within most word processing programs also make editing, rewriting and changing the document easy. Perhaps the senior students have seen the advantages in these features of the application software.

Upper level classes may require more research and report writing than the introductory classes that more freshmen students would be taking. Upper-level classes could also contain assignments that require integration of information from several programs. For example, a business report might include an income statement developed using a spreadsheet program, a

company logo from a clip art or graphic file and written text using a word processing program.

In addition to using electronic mail and word processing, the senior students in this study also used presentation and web page development software more often than freshmen.

Reasons for this occurrence could be that after students learn the basics of electronic mail and word processing they try new programs to develop additional computer skills. Some course requirements in upper-level classes might include the construction of a Web Page or a class presentation that would require the use of additional computer programs.

The fact that the freshmen in this study used more computer programming languages than the seniors was surprising. Popular programming languages with the freshmen were JAVA and Basic. Basic programming language is used to write programs for business applications and JAVA programming is a language that allows a user to include animation, scrolling messages and other "eye-catching" features on a web page.

The current job market for students with a computer science degree is promising. Perhaps freshmen are taking courses in programming to gain exposure to various programming applications used in the job market, to prepare for a good job in the future or to obtain certification in the computer science field. Another reason that the freshmen stated that they used more programming languages than seniors could be because BASIC programming

is a 200-level course. This level of course is generally taken by students in their sophomore year but can be taken by second-semester freshmen who have completed the pre-requisites for the class. Generally, seniors would not be enrolled in a 200-level course. If senior students have previously taken a BASIC programming class, they are not using the program in their other coursework.

6. Both groups of students at MSU felt they had adequate access to the computer facilities they needed to complete their coursework.

According to McLaney and Thurman (1988), Caporeal (1985), McCollum (1998) and Turner (1987), access to computer facilities was important in determining which students used computers. MSU has made, and is continuing to make, access to technology available to all students. MSU has both an academic and administrative computer system. The academic system is the system that houses all student accounts and other academic related software, such as SPSS and MiniTab. When students register for a class, they are automatically given an account on the academic system. This account allows them access to electronic mail, the World Wide Web, and University library resources. Each student account contains 1.2 Mg of disk space on the main academic server. Students are allowed and encouraged to use their account to store information and download programs. A student web server is also available for students to use when web page construction is required for their coursework.

Plans for 1999 include wiring all residence halls to the campus network. This will allow students in the residence halls quicker access to the University's computer facilities across the campus backbone network. Students living off-campus will not have this same high-speed connection but will continue to be able to connect the computing facilities by using a modem.

Recommendations

The use of technology in education is here to stay. The use of a computer in college is no longer an advantage but has become a necessity. The findings of this study indicated that MSU students use the technology facilities available to them and that the required use of computers in coursework increased from the freshmen year to the senior year. According to Patrick (1999) MSU currently has the best student to computer ratio (10:1) of the colleges and universities in Kentucky. Students in both groups of this study indicated that currently they have access to the computer facilities they need, but to ensure that this trend continues the following recommendations are made.

The computer staff at MSU must work with faculty to determine what computer applications are currently required or will be required in coursework. Once these requirements have been determined, MSU should continue to make the required software applications available to the students either by providing access to computers that have the software installed or by making the software available for students to purchase.

Making the required software available to students is important, but students also need support in using the software. This support could be limited to software applications that are used in most areas of study. For example, support the Office 97 suite of products and electronic mail, which are used by most students, but do not support specific applications such MiniTab, which is used only by the mathematics department, or an accounting program used only in the College of Business. The specific application software could be supported by the individual department or college in which the software is required.

Currently, MSU does support the Office 97 products, electronic mail and a few other basic programs, but as more courses begin to require the use of other programs these programs will need to be supported as well. The use of Web Page development and presentation software was shown to increase as students progressed from their freshmen year to their senior year. If student use of these programs become more frequently required in course work in the future, these will also need to be supported. The level of support available may make a difference in the success of the student's achievement in the class.

The use of distance learning and the Internet as a teaching medium will continue to increase. This will become a new area in which student support will be needed. Students will be expected to learn and use the software required for these classes. Whatever the changes in student

demand for technology applications and support may be, MSU should continue to provide as much assistance and support to the students as possible.

Access to computing facilities has been shown by McLaney and Thurman (1998), Caporeal (1985), McCollum (1998) and Turner (1987) to be one of the key issues when discussing the use of computer facilities. Students cannot use the computing facilities if they do not have access to them. MSU has made, and continues to make, student access to computing facilities a high priority. Several laboratories on campus are available for student use, and computers are also available in the library. Students who own their own computers and live on campus will be able to take advantage of the new high-speed networked communications that will be place in the residence hall this year. Students living off-campus will continue to be able to connect to the University's resources by using a modem. Currently, students living off-campus or in the extended campus regions and dialing in to the University's computer facilities via modem are not able to view graphics. Perhaps making this feature available to these students could be addressed by the University in the near future.

Suggestions for Further Study

Further study on this topic is suggested. One such study could be to determine the type of computer facilities and software available to the students in high schools. Research in the high schools in the 22-county

service region of MSU would be beneficial in determining why students indicated preferences for certain software packages. Since all of the high schools in the 22-county region adopted KERA technology initiatives and can purchase their software via a state price contract, perhaps these high schools use the same brands of software.

In 1990, the elementary and secondary schools in Kentucky adopted the guidelines of KERA. One component of KERA related to the use of technology across the curriculum. Traditional students would have completed high school under KERA initiatives whereas non-traditional students would have either not completed high school or completed high school prior to KERA. A study in which students are identified as traditional or non-traditional students would help determine the impact of the KERA technology initiative as it relates to prior computer use and the use of computers in college. Most colleges and universities maintain data that can separate the non-traditional students from the traditional students. At MSU, a non-traditional student is defined as a student who is 23 years of age or older, and/or married, and/or did not complete a regular high school program.

Perhaps this type of study would show that prior use is a factor in determining which students use computers in college and which do not. If a correlation is found between prior computer use and the use of computers in college, workshops and classes could be developed and taught to small

groups of these students to help them learn about computers and software and to allow them to practice and become comfortable with using computers.

A similar study on student computer usage patterns at other regional universities in Kentucky would be beneficial in determining how the usage patterns of students at these colleges compare with the usage patterns of MSU students. Perhaps these comparisons would show emerging trends and similarities or differences in the use of computers at colleges and universities in Kentucky.

With access to computer facilities being one main important factor in determining which students use computers and the facilities on campus being upgraded to include computer connections in the residence halls, a study comparing the amount of time students spend using computers and their grade point average (GPA) would be beneficial in future planning and student counseling. This study could indicate whether or not greater computer use alone has a positive or negative impact on scholastic achievement (GPA), or it may show that the type of computer use, and not necessarily the amount of computer use, has the real impact on the scholastic achievement of students.

The study by Caporeal (1985) found that there was an inverse relationship between computer use time and the time spent studying, but her study did not address the effects of computer use time on the student's GPA. Students may spend time using the computer to play games or chat. These

activities would be included in computer use time, but probably are not academic related.

If this type of study is performed, it should address not only the amount of computer use time, but also the purpose of using the computer. Is there a point at which the use of a computer has a negative effect on a student's GPA? Do students become addicted to games and skip their classes, stay up late and not study?

Although this research did answer several questions regarding computer usage patterns of students at MSU, more questions remain to be answered. Additional details on the various ways and purposes of student computer use would be beneficial in financial and curriculum planning.

This project warrants additional study. Because the sample used in this study was MSU students, this study could be expanded to include students at other colleges and universities in the state to gain a broader knowledge of the impact of computer use. This study could also be expanded to investigate the impact of computer use on other areas of student development. For example, their GPA or their social interaction with faculty and other students.

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APPENDICIES

APPENDIX A
Personal Computer Survey

PART I - CLASSIFICATION

Please indicate you current classification.

Classification: (check one)
- _ Freshman
- _ Sophomore
- _ Junior
- _ Senior
- _ Graduate Student

PART II - SOFTWARE/PROGRAMMING APPLICATIONS

Please indicate the software programs you have used while attending MSU

Applications:

Word Processor: (check one)
- _ MS Word
- _ MS Works
- _ Word Perfect
- _ Other

_____
- _ None

Spreadsheet:
- _ MS Excel
- _ Lotus
- _ Quattro Pro
- _ Other

_____
- _ None

Presentation:
- _ MS Powerpoint
- _ Astound
- _

Other_____
- _ None

DataBase:
- _ MS Access
- _ Dbase
- _ Lotus Approach
- _ Other

_____
- _ None

Internet Browser:
- _ Netscape
- _ Internet Explorer
- _ Other

_____
- _ None

Web Page Creation Tools:
- _ FrontPage
- _ Page Composer
- _ Other

_____
- _ None

Programming Languages:
- _ Basic
- _ C++
- _ Java
- _ Fortran
- _ Cobol
- _ Other

_____
- _ None

PART III - USAGE

Course Usage: Requirements and Type

Please indicate how often computer usage is/has been required in your Class work: (Please check one)

My teacher requires that I use a computer for my classes:

_ Over 75% of my classes have required some type of computer use
_ Between 50% and 75% of my classes have required some type of computer use
_ Between 25% and 50% of my classes have required some type of computer use
_ Less than 25% of my classes have required some type of computer use
_ I have never been required to use a computer in a class

My classes require the following types of computer use

_ E-Mail
_ Wordprocessing
_ Spreadsheets
_ Database
_ Presentations
_ Internet Searching
_ Web Page creation
_ Programming
_ Distance Learning
_ Other (Please specify)_____

Access:

How would you rate your access to the hardware and software you need?

_ I have access to everything I need
_ I have access to most everything I need
_ I have access only to part of what I need
_ I have access to very little of what I need
_ I do not have access

Personal Usage:

Please indicate your primary and secondary reasons for using computers.

I use a computer primarily for:
_ School Assignments
_ Browsing the Internet
_ e-mail to family and friends
_ Creating Web Pages
_ Programming
_ Games
_ Chatting
_ Other (Please specify)_____

I use a computer secondarily for:

_ School assignments
_ Browsing the Internet
_ E-Mail to family and friends
_ Creating Web Pages
_ Programming
_ Games
_ Chatting
_ Other (Please Specify)_____

Frequency of Usage - Please check one

I use a computer for ***E-Mail***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Word Processing***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Spreadsheets***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***DataBase***
_ more than once a day
_ once a day_____
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Presentations***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Internet Searching***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Web Page Creation***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Programming***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Distance Learning***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once a week
_ once a month
_ less than once a month
_ never

I use a computer for ***Other (Please indicate)***
_ more than once a day
_ once a day
_ more than once a week, but less than once a day
_ once a week
_ more than once a month, but less than once
a week
- once a week
- once a month
- less than once a month
- never.

APPENDIX B

DATE

Dear Participant:

I am requesting your assistance with my research project. This research project is being performed in partial fulfillment of the requirements for completion of my EdS degree. The purpose of this research project is to gather information regarding the use of personal computers by students at Morehead State University.

The packet distributed to you contains a brief questionnaire and a consent form. The questionnaire will take approximately ten minutes to complete. Your participation in this study is on a voluntary basis and no extra credit will be given for your participation. You may chose not to participate or you may withdraw from participation at any time.

After you have completed the questionnaire and the consent form, the researcher will separate the questionnaire from the consent form and you will not be identified in any way. Only the data from the questionnaires will be use for analysis. All questionnaires and consent forms will be kept in a file cabinet in a locked office.

If you wish to participate in the survey, please sign the consent form and return it along with the questionnaire.

Thank you for your time, participation and information.

Sincerely,

Debbie A. White

ATT

APPENDIX C

Consent Form

Dear Participant:

I am requesting your help with a research project I am conducting on the use of computers. Let me emphasize that you do not have to participate. If you do not wish to take part in the survey, you do not have to answer any of the questions. Completing this survey is voluntary and you may withdraw from the study at any time.

You must be 18 years of age or older to participate. This study has been reviewed to determine that participants' rights are safeguarded and there appears to be minimal risk or discomfort associated with the completion of the survey. You may choose to discontinue your participation at any time. Also, you need to understand that participating or not participating in the survey has no impact on your grade in this or any other class. Your decision to volunteer to complete the survey cannot hurt or help you with your grade. If extra credit is offered and you do not wish to participate or are under the age of 18, and alternative method of credit will be offered.

The answers you provide will be kept strictly confidential and the survey will be stored in a locked filing cabinet or locked office. Please feel free to ask for help if something does not make sense to you or if you have any questions. If you experience any discomfort, you may contact Debbie A. White at 606-783-2583.

If you decide to volunteer, please be sure to print you name on the form and sign it to indicate your willingness to participate. That will be our indication that you understand the purpose of the survey and that you are willing to help.

Name (please print): _____

Signature: _____

APPENDIX D

TABLE 1

Survey Results - Totals			
Question	Seniors	Freshmen	Comments
Software/Programming Applications			
Word Processor::			
MS Word	90	87	
MS Works	64	64	
Word Perfect	42	40	
Other	9	2	Claris Works, Word Pad
None	1	1	
Spreadsheets:			
MS Excel	77	63	
Lotus	13	7	
Quatro Pro	2	2	
Other	1	2	
None	21	27	
Presentations:			
MS Powerpoint	79	50	
Astound	0	3	
Other	3	13	Adobe Page Maker
None	22	40	
DataBase:			
MS Access	36	46	
Dbase	8	7	
Lotus Approach	3	5	
Other	3	5	Quick Books
None	44	50	
Internet Browser:			
Netscape	97	96	
Internet Explorer	61	71	
Other	3	0	
None	0	3	
Web Page Creation Tools:			
FrontPage	16	19	
Page Composer	14	9	
Other	31	5	PageMill, AOLPress, MSPub
None	57	74	

Survey Results - Totals					
Programming Languages:					
Basic	30	29			
C++	1	3			
Java	18	25			
Fortran	1	1			
Cobol					
Other					
None					
Course Usage: Requirements & Types					
My teacher required that I use a computer for my classes:					
Over 75% of the time	64	32			
Between 50% and 75%	25	38			
Between 25% and 50%	11	27			
Less than 25%	4	12			
Never	1	1			
My classes require the following types of computer use					
E-Mail	88	89			
Word Processing	98	95			
Spreadsheets	47	50			
Database	17	22			
Presentations	65	37			
Internet Searching	87	85			
Web Page Creation	44	7			
Programming	7	5			
Distance Learning	11	2			
Other	12	1		Music composer	
How would you rate your access to the hardware and software you need?					
I have access to everything I need	31	48			
I have access to most everything I need	62	54			
I have access only to part of what I need	8	7			
I have access to very little of what I need	3	0			
I do not have access	0	0			

Survey Results - Totals					
Personal Usage					
I use my computer primarily for:					
School Assignments	88	83			
E-Mail to family and friends	30	34			
Creating Web Pages	32	36			
Programming	4	5			
Games	0	3			
Chatting	10	18			
Other	3	11			
	3	1			
I use my computer secondarily for:					
School Assignments	22	29			
E-Mail to family and friends	41	41			
Creating Web Pages	29	39			
Programming	2	2			
Games	2	3			
Chatting	20	20			
Other	7	10		Business	
Frequency of Use					
I use a computer for E-mail:					
More than once a day	33	36			
Once a day	35	22			
More than once a week, but less than once a day	25	19			
Once a week	5	4			
More than once a month, but less than once a week	1	8			
Once a month	3	3			
Less than once a month	5	5			
Never		7			
I use a computer for Word Processing:					
More than once a day	0	5			
Once a day	28	10			
More than once a week, but less than once a day	21	44			
Once a week	47	14			
More than once a month, but less than once a week	2	23			
Once a month	4	4			
Less than once a month	0	3			
Never	1	4			

Survey Results - Totals					
I use a computer for spreadsheets					
More than once a day	2	1			
Once a day	1	1			
More than once a week, but less than once a day	1	12			
Once a week	4	8			
More than once a month, but less than once a week	23	20			
Once a month	13	5			
Less than once a month	33	26			
Never	29	34			
I use a computer for Database					
More than once a day	0	1			
Once a day	2	2			
More than once a week, but less than once a day	3	9			
Once a week	3	4			
More than once a month, but less than once a week	13	15			
Once a month	7	7			
Less than once a month	24	22			
Never	55	48			
I use a computer for Presentations:					
More than once a day	3	2			
Once a day	0	1			
More than once a week, but less than once a day	11	2			
Once a week	5	1			
More than once a month, but less than once a week	16	19			
Once a month	14	10			
Less than once a month	38	27			
Never	24	44			
I use a computer for Internet Searching:					
More than once a day	25	26			
Once a day	19	17			
More than once a week, but less than once a day	38	32			
Once a week	12	11			
More than once a month, but less than once a week	11	18			
Once a month	1	0			
Less than once a month	3	6			
Never	2	3			

Survey Results - Totals					
I use a computer for distance Learning					
More than once a day	1	0			
Once a day	1	3			
More than once a week, but less than once a day	3	7			
Once a week	4	3			
More than once a month, but less than once a week	3	3			
Once a month	0	5			
Less than once a month	5	11			
Never	86	76			
I use a computer for other reasons					
More than once a day	16	9			
Once a day	4	7			
More than once a week, but less than once a day	11	12			
Once a week	2	3			
More than once a month, but less than once a week	13	6			
Once a month	1	6			
Less than once a month	5	3			
Never	43	54			